CSc 3320: Systems Programming

Spring 2021

Homework

2: Total points 100

Submission instructions:

1. Create a Google doc for each homework assignment submission.
2. Start your responses from page 2 of the document and copy these instructions on page 1.
3. Fill in your name, campus ID and panther # in the fields provided. If this information is missing in your document TWO POINTS WILL BE DEDUCTED per submission.
4. Keep this page 1 intact on all your submissions. If this *submissions instructions* page is missing in your submission TWO POINTS WILL BE DEDUCTED per submission.
5. Each homework will typically have 2-3 PARTS, where each PART focuses on specific topic(s).
6. Start your responses to each PART on a new page.
7. If you are being asked to write code copy the code into a separate txt file and submit that as well.
8. If you are being asked to test code or run specific commands or scripts, provide the evidence of your outputs through a screenshot and copy the same into the document.
9. Upon completion, download a .PDF version of the document and submit the same.

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PART 1 (2.5 points each): 10pts

1. What are the differences among ***grep****, **egrep** and **fgrep***? Describe using an example.

a. grep: search a specific string in a file, list files, and any given command in that file.
Ex. grep "abc" alphabet.txt

b. egrep: extended-grep is used for regex patterns in a file. It is also same as grep -E.
Ex. egrep '/abc/p' alphabet.txt

c. fgrep: used to find entire strings
Ex. fgrep [options] [pattern list] [pattern] [file]

2. Which utility can be used to compress and decompress files? And how to compress multiple files into a single file? Please provide one example for it.

Use tar command to compress and decompress files. Compress multiple files into one file like:
tar -cvf files.tar onefile twofile

3. Which utility (or utilities) can break a line into multiple fields by defining a separator? What is the default separator? How to define a separator manually in the command line? Please provide one example for defining the separator for each utility.

awk breaks a line in multiple fields. Default separator is space (or tabs), which can be used as data separators.
Ex. awk [options] '[]' '{...; …; …;}' filename
In this example, ';' and ' ' act like seperators

4. What does the ***sort*** command do? What are the different possible fields? Explain using an example.

Sort the files, its contents, etc in ascending or descending order depending on the given field. Fields include: -r, -k, -n, etc.
Ex. sort -r filename.txt
This shows the content in the .txt file in descending order

Part IIa (5 points each): 25pts

5. What is the output of the following sequence of bash commands: **echo 'Hello World' | sed 's/$/!!!/g'**

   Hello World!!!

6. What is the output for each of these awk script commands?

   -- 1 <= NF { print $5 }
   Print values of column 5
   -- NR >= 1 && NR >= 5 { print $1 }
   Print lines from number 1 to 5 and print column 1
   -- 1,5 { print $0 }
   For all values, print all contents in the file
   -- {print $1 }
   Print all values in column 1

7. What is the output of following command line:
   echo good | sed '/Good/d'
   good

8. Which **awk** script outputs all the lines where a plus sign + appears at the end of line?
   ^+$/{print $0}

9. What is the command to delete only the first 5 lines in a file "foo"? Which command deletes only the last 5 lines?
   sed -i,5d foo
Head -n -5 foo

Part IIb (10pts each): 50pts

Describe the function (5pts) and output (5pts) of the following commands.

9. **$ cat float**

Wish I was floating in blue across the sky, my imagination is strong,
And I often visit the days
When everything seemed so clear.
Now I wonder what I'm doing here at all...

$ cat h1.awk
Go into h1.awk file

```
NR>2 && NR<4{print NR ":" $0
```

Displays line 3 and column 0

$ awk '/.*ing/ {print NR ":" $1}' float

1. Wish
3. When
4. Now

This code prints row number and first word of line with "ing" pattern

10. As the next command following question 9,

$ awk -f h1.awk float

When everything seemed so clear.

11.

$ **cat h2.awk**

```
BEGIN { print    "Start to scan file" }
{print $1      "," $NF}
END {print     "END-" , FILENAME }
```

$ awk -f h2.awk float

Wish, strong,
And, days
When, clear.
Now, all…
print $1 "," $NF: print first word of each line and a comma
print "END-" , FILENAME: print last word of each line

12. sed 's/\s/\t/g' float
First s means substitute spaces (second s) for tabs (t after second s) and at the end g means for the entire file
13.
$ ls *.awk| awk '{print "grep --color 'BEGIN' " $1 }' |sh *(Notes: **sh file** runs file as a shell script . $1 should be the output of* ‘ ls *.awk ‘ in this case, not the 1st field *)*
BEGIN
Search for BEGIN and highlights it and prints the line, in this case the first one

14.
$ mkdir test test/test1 test/test2
$cat>test/testt.txt
This is a test file ^D
Shows file contents and CTRL+D to exit
$ cd test
Change directory to test
$ ls -l **.** | grep '^d' | awk '{print "cp -r " $NF " " $NF ".bak"}' | sh
Copies the file and creates a .bak or backup file and pipes to sh

Part III Programming: 15pts

15. Sort all the files in your class working directory (or your home directory) as per the following requirements:

a. A copy of each file in that folder must be made. Append the string "_copy" to the name of the file

```
[mpatel185@gsuad.gsu.edu@snowball ~]$ ls
csc3320                  homeworks  Lab3  mpatel185  test.txt
homework_instructions.txt  Lab2_P2    Lab4  simple.sh  TEXT
[mpatel185@gsuad.gsu.edu@snowball ~]$ cd TEXT
[mpatel185@gsuad.gsu.edu@snowball TEXT]$ ls
[mpatel185@gsuad.gsu.edu@snowball TEXT]$ cd
[mpatel185@gsuad.gsu.edu@snowball ~]$ cd ~
[mpatel185@gsuad.gsu.edu@snowball ~]$ cp homework_instructions.txt TEXT/homework_
instructions_copy.txt
[mpatel185@gsuad.gsu.edu@snowball ~]$ cp test.txt TEXT/test_copy.txt
[mpatel185@gsuad.gsu.edu@snowball ~]$ more TEXT

*** TEXT: directory ***
```

b. The duplicate (copied) files must be in separate directories with each directory specifying the type of the file (e.g. txt files in directory named txtfiles, pdf files in directory named pdffiles etc).

```
[mpatel185@gsuad.gsu.edu@snowball ~]$ cd TEXT
[mpatel185@gsuad.gsu.edu@snowball TEXT]$ ls
homework_instructions_copy.txt  test_copy.txt
```

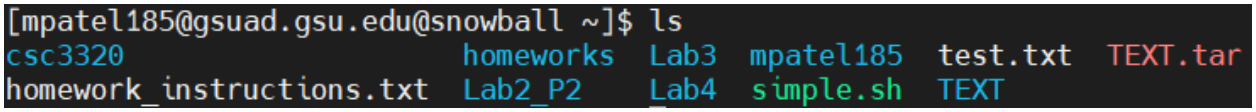
c. The files in each directory must be sorted in chronological order of months.

```
[mpatel185@gsuad.gsu.edu@snowball TEXT]$ ls -lrth
total 8.0K
-rw-rw-r--. 1 mpatel185@gsuad.gsu.edu mpatel185@gsuad.gsu.edu 1010 Feb 14 17:04 h
omework_instructions_copy.txt
-rw-rw-r--. 1 mpatel185@gsuad.gsu.edu mpatel185@gsuad.gsu.edu    8 Feb 14 17:05 t
est_copy.txt
```

d. An archive file (.tar) of each directory must be made. The .tar files must be sorted by name in ascending order.

```
[mpatel185@gsuad.gsu.edu@snowball ~]$ tar -cvf TEXT.tar TEXT|sort
TEXT/
TEXT/homework_instructions_copy.txt
TEXT/test_copy.txt
[mpatel185@gsuad.gsu.edu@snowball ~]$
```

e. An archive file of all the .tar archive files must be made and be available in your home directory.



As an output, show your screen shots for each step or a single screenshot that will cover the outputs from all the steps.